B.22 IN-SPACE PROPULSION PROGRAM – CYCLE 3A

1. Scope of Program

1.1 Program Overview

The goal of the In-Space Propulsion (ISP) program of the NASA Science Mission Directorate (SMD) is to develop advanced propulsion technologies for use beyond Earth orbit that enable or reduce trip times, mass, and/or cost associated with NASA science missions to the outer planets, satellites, small bodies, and other solar system destinations. This solicitation (Cycle 3A) continues a series of solicitations to support the ISP program. This solicitation is not intended to provide flight hardware utilized for a specific mission, but to develop technologies that may enable missions to be planned that might otherwise be considered untenable. In particular, Cycle 3A specifically solicits proposals for technology development under the following advanced ISP technology areas:

- Solar Sails
- Advanced Chemical
- Momentum-eXchange/Electrodynamic Reboost (MXER)

Under each of the above technology areas, there are one or more subtopics for which proposals may be submitted. Each submitted proposal should address only one of these technologies and only a single technology subtopic area. However, there is no restriction on the number of proposals that may be submitted by a given organization. Expanded definitions of the technologies identified above and their subtopics are further provided in the ISP Program Proposal Information Package (PIP) at http://www.inspacepropulsion.com/code_s/pip.html.

1.2 Teaming Arrangements

Teaming arrangements of all kinds are encouraged by proposing organizations, including nonprofit and for-profit, private, and Governmental. If a non-NASA organization wishes to team with a NASA Center, such negotiations must be accomplished prior to submission of the proposal, and all costs associated with the intended activities at that NASA Center must be included in the cost section of the proposal. Note that no preference will be given to proposals that seek to team with a NASA Center, nor for proposals that come from a NASA Center. For those wishing to consider teaming with a NASA Center, the points of contact for proposals to this solicitation are:

- NASA Ames Research Center: Dean A. Kontinos (phone: 650-604-4283, E-mail: Dean.A.Kontinos@nasa.gov);
- NASA Glenn Research Center: Tibor Kremic (phone: 216-433-5003, E-mail: Tibor.Kremic-l@nasa.gov);
- NASA Johnson Space Flight Center: Thomas B. Smith (phone: 281-483-6309, E-mail: Thomas.B.Smith@nasa.gov);
- NASA Langley Research Center: James M. Corliss (phone: 757-864-7627, E-mail: James.M.Corliss@nasa.gov);

- NASA Marshall Space Flight Center: Stephen L. Rodgers (phone: 256-544-0818, E-mail: Stephen.L.Rodgers@nasa.gov); and
- NASA Jet Propulsion Laboratory: Ronald T. Reeve (phone: 818-393-4156, E-mail: Ronald.T.Reeve-103272@jpl.nasa.gov).

1.3 Solicited Technologies

1.3.1 Solar Sails

For additional information regarding the Solar Sail technology area, refer to Section 1.0 of the Proposal Information Package, URL located in section 1.1 above.

1.3.2 Advanced Chemical

For additional information regarding the Advanced Chemical technology area, refer to Section 2.0 of the Proposal Information Package, URL located in section 1.1 above.

1.3.3 Momentum-eXchange/Electrodynamic Reboost (MXER) Hybrid Tether

For additional information regarding the MXER technology area, refer to Section 3.0 of the Proposal Information Package, URL located in section 1.1 above.

2. Programmatic Information

2.1 General Provisions

All activities selected through this solicitation will be funded solely through contracts having a base period of performance for each technical area as noted in Section 2.2 below. Proposals for efforts greater than the specified initial base period must be structured with follow on options not to exceed a one year timeframe per option period (unless otherwise noted in this solicitation). Proposals must define clearly measurable milestones (a minimum of two per base period and each option period) to be achieved in order to justify continuation of funding. Funding approval for each subsequent option will be based on achievements toward milestones for the current period of performance and the continued program needs and funding availability. Exercise of contract options will be based on performance and the availability of funds in future years. There is no guarantee that any options will be funded for the remaining proposed period of performance for the tasks selected under this solicitation. NASA reserves the right to not select any proposal for this NRA solicitation.

2.2 Budget Information

The following budget information is tentative, subject to the availability of funds, and provided for planning purposes only. The anticipated budget shown below does not guarantee that the exact number of awards mentioned will be funded and should only be used as a guide and not an

absolute indication of awards to be made. Note that the anticipated funding levels for the base period and option(s) are the total funds anticipated to be available for all awards in that subtopic task area.

2.2.1 Solar Sails

Subtopic area: Scaling Law Development
Base period anticipated budget is $0.1M for a single initial selection (base performance period of five months); one option period allowed within an anticipated budget of $0.1M (single option performance period not to exceed 12 months).

Subtopic area: Thrust Measurement in a Simulated Solar Energy Facility
Base period anticipated budget is $0.6M for no more than two initial selections (base performance period of five months); one option period allowed within an anticipated budget of $0.6M (single option performance period not to exceed 12 months).

2.2.2 Advanced Chemical

Subtopic Area: Advanced In-Space Chemical Thrusters capable of operating in higher temperatures
Base period anticipated budget is $0.6M for an initial selection (base performance period of approximately nine months); if appropriate two option periods allowed within an anticipated budget of $3M (with a total combined performance period not to exceed two years).

2.2.3 Momentum eXchange /Electrodynamic Reboost

Subtopic Area: Development of A MXER Hybrid Tether
Base period anticipated budget is $0.2 M for no more than two initial selections (base performance period of nine months); option 1 period allowed within an anticipated budget of $1.5 M (option performance period not to exceed 12 months); option 2 period allowed within an anticipated budget of $0.5 M (option performance period not to exceed 12 months).

2.3 Proposal Preparation and Submission Information

In addition to the page limitations stated in Section 2 of the NASA Guidebook for Proposers, ISP proposals must also contain a Statement of Work (SOW) to be performed, not to exceed three pages in length, which is to be inserted directly after the "References" section of the proposal. The SOW should be provided in paragraph form and include an introduction describing the objective and scope of the proposed activities. Work descriptions are to be provided by major tasks or work breakdown structure elements for the basic period and option period if applicable. Each task description should include (by performing organization) major deliverables and proposed period of performance. A quad chart in Microsoft PowerPoint format (template provided in Figure 1) is also required and should be inserted directly after the SOW.

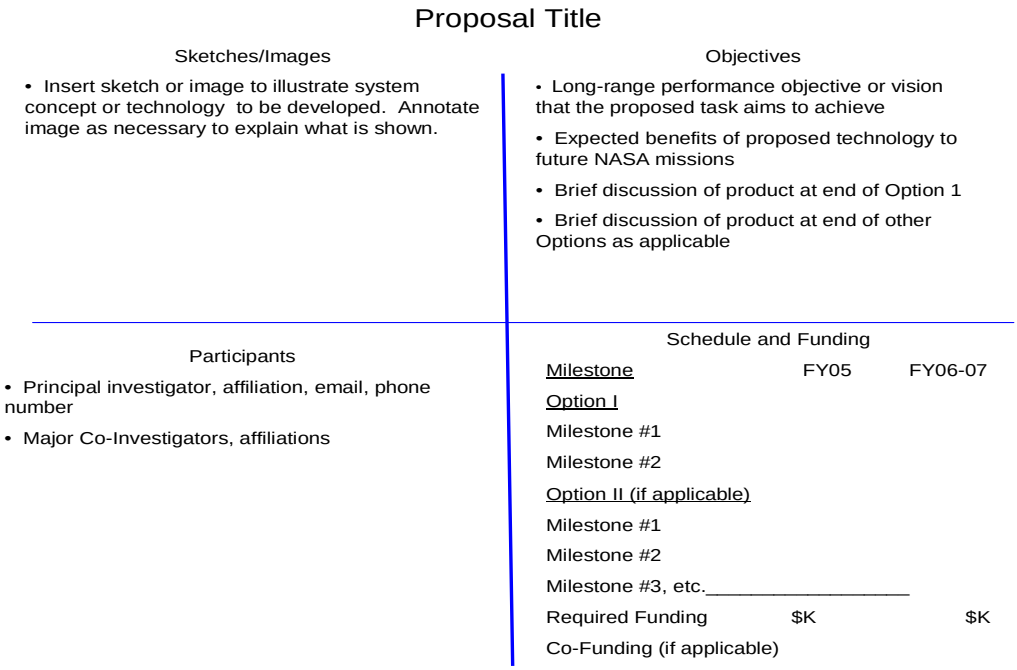

Figure 1. Quad Chart Template

As an amendment to the information given in Section IV(c) of the *Summary of Solicitation* of this NRA, twenty (20) copies of each proposal, the original signed proposal, one CD-ROM containing a searchable PDF version of the proposal, and the Microsoft PowerPoint quad chart referenced in Figure 1 must be delivered.

2.4 Program Administration

NASA Headquarters will assemble a panel of independent experts to evaluate the proposals and the Program Executive will recommend selections to the NASA Headquarters Selection Official. NASA's Marshall Space Flight Center (MSFC) will have responsibility for implementation of awards resulting from this solicitation. Reviews will be held in conjunction with project level or task milestones, with a minimum of an initial and a final review. These reviews will document the progress against Technical Performance Measures (TPMs) established prior to award and against other performance metrics such as deliverables, completion of design drawings, test results, cost vs. budget statistics, and adherence to planned schedules. Awards resulting from this solicitation will be contracts and, where allowed, will include options to continue on a yearly basis. To support these requirements, NASA will provide a total of two days of training for all awardees (for awards in excess of $l.0 M) at MSFC in risk management. Proposals in response to this solicitation should include an appropriate budget for this training activity in Huntsville, Alabama.

The ISP Program utilizes the Space Transportation Information Network (STIN) to ensure that project/task activities are in compliance with the program requirements. STIN is a Web-based

(secure server) database that tracks the progress of project/task activities and provides a single repository for technical and programmatic information related to the project. Upon initiation of any award, all awardees shall be responsible for entering all research and technology task data, such as, but not limited to, monthly status reports, risk management plans, failure reporting plans, test data, technical performance metrics, budget status, schedules, briefings, or any project/task information deemed necessary by the ISP Program implementing office. Data shall be entered and updated on at least a monthly basis throughout the life of the project/task into the STIN database. All documentation required will utilize industry standards (i.e., Microsoft Office, PDF, etc.). An online tutorial for training, technical support, and access to STIN are provided at http://stin.nasa.gov (click on the tutorial function) in order to meet this requirement. Initial estimates are that no more than two days are required to set up the initial task information in STIN, no more than two days are required for online STIN tutorial training, and no more than one hour per month is required to upload the required documents support STIN. Travel will not be required for STIN training. Note that the STIN database requires only a browser to access the system; no special plug-ins are required; and the system was designed, developed, and tested for full functionality on Mac, PC, and Unix platforms.

All documents which propose to document Technology Readiness Level (TRL) progress by analysis, similarity, or test require review and approval of the In-Space Propulsion Technology Projects Office (ISPTPO). In addition, all test requirements and test procedures require review and approval prior to implementation by the ISPTPO

Reporting requirements include, as a minimum, a Final Report of content and format suitable for submittal as a formal Contractor Report or equivalent Government report (e.g. NASA Technical Memorandum NPR 2200.2A, *Guidelines for Documentation, Approval, and Dissemination of NASA Scientific and Technical Information*, at http://www.sti.nasa.gov/npg.pdf). Efforts to develop a final report should be included in planned task resources and schedule. All selected participants in this program will be required to develop and present a technical paper or papers describing results of funded work at a suitable technical conference so as to be included in formal conference proceedings and/or publish results of funded work in the appropriate peer-reviewed technical journal.

2.5 Supplemental Information

IMPORTANT INFORMATION

As discussed in the *Summary of Solicitation* of this NRA, the Office of Space Science (now the Science Mission Directorate) now uses a single, unified set of instructions for the submission of proposals given in the document entitled *NASA Guidebook for Proposers Responding to NASA Research Announcement - 2004* (or *NASA Guidebook for Proposers* for short) that is accessible by opening http://research.hq.nasa.gov/ and linking through the menu item "Helpful References," or it may be directly accessed at http://www.hq.nasa.gov/office/procurement/nraguidebook/ (note that the updated 2004 edition of the Guidebook is used for this solicitation). This NRA's *Summary of Solicitation* also contains the instructions relevant to the electronic submission of a Notice of Intent (NOI) to propose and a proposal's Cover Page/Proposal Summary/Budget Summary, as well as the mailing address for the submission of the hard copies of a proposal.

The schedule for the submission of Notices of Intent (NOIs) to propose, which are not required but strongly encouraged, and of the hard copies of the proposals is:

• NOI Due Date	December 3, 2004
• Proposal Due Date (4:30 p.m. EST)	February 4, 2005

Further information about this program may be obtained from the Program Officer:

Mr. James R Robinson
Solar System Division
Science Mission Directorate
NASA Headquarters
Washington, DC, 20546-0001

Phone: 202-358-2543
Facsimile: 202-358-3097
E-mail: james.r.robinson-1@nasa.gov